REMARKS

Claims 1-4 and 6, all the claims pending in the application, stand rejected. Claim 4 is amended to correct an error in the stated range, for consistency with the specification. New dependent claim 7 is added. Applicants respectfully submit that all claims are now patentable for the following reasons.

Claim Rejections - 35 USC § 112

Claim 4 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. This rejection is traversed for at least the following reasons.

The Examiner notes that Applicants' disclosure provides a sufficient basis for a limitation wherein the glass substrate has a thickness of "0.2 to 0.9 mm" or alternatively a thickness of "0.2 to 0.6 mm." The Examiner finds insufficient support for the present limitation wherein the glass substrate has a thickness of "0.6 mm or less".

The phrase "a thickness of 0.6 mm or less" as recited in claim 4 has been changed to "a thickness of 0.2 to 0.9 mm" for consistency with the disclosure. This thickness range is clearly supported by the description of at page 9, lines 2-5 in the present specification.

New claim 7 recites "the glass substrate has a thickness of 0.2 to 0.6 mm." The same original text in the specification supports this limitation. No new issues are raised by this addition as the Examiner already has focused on the error.

Claim Rejections - 35 USC § 103

Claim 1-4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (US 6,119,483) in view of Aratani (US 4,671,814). This rejection is traversed for at least the following reasons.

The Examiner substantially repeats the basis for rejection from the Office Action dated October 10, 2006.

In the Response to Arguments of the present Office Action at pages 6 and 7, the Examiner comments that "In response to applicant's arguments against the Takahashi and Aratani references individually, one cannot show nonobviousness by attacking references

individually where the rejections are based on combinations of references. See *In re Keller,* 642 F.2d 413, 208 USPQ 871 *(CCPA* 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)." Applicants respectfully submit that the argument is not against the references individually, but comprises (1) an analysis of the references individually to identify their different focus with respect to (a) each other and (b) the present invention, and (2) an analysis of the incompatibility of the two references that would preclude their combination and even their consideration together with respect to the method of manufacturing a glass substrate for a magnetic disk, which is claimed as the present invention.

Feature of the Claimed Invention

According to the features of the present invention as stated in claim 1, there are two stage processes, the role of the two processes in achieving a desired compression stress and tensile stress that is required for the intended application, namely use in magnetic disks, is critical.

At a first-stage process, the glass substrate is chemically strengthened by the use of a first alkali ion having a first ion radius greater than a smallest ion radius of a smallest alkali ion among the alkali ions contained in the glass substrate so as to produce compression stress on a surface of the glass substrate and to produce tensile stress in a depth of the glass substrate.

At a second-stage process, the glass substrate is chemically strengthened by the use of a second alkali ion having a second ion radius greater than the first ion radius of the first alkali ion so as to (1) increase the compression stress of the surface of the glass substrate and (2) reduce the tensile stress of the depth of the glass substrate.

By such a specific two-stage process, it is possible to manufacture the glass substrate for the magnetic disk, which is high in transverse strength and is prevented from damage or breakage with time.

The process and goals of the present invention differ from those of the two cited references to Takahashi and Aratani.

Takahashi

Takahashi discloses that a chemical strengthening process is carried out by dipping a glass substrate into a mixed molten salt containing sodium nitrate and potassium nitrate in order to manufacture a glass substrate for a magnetic disk. However, Takahashi fails to disclose the

two-stage process. The Examiner clearly recognizes this deficiency. Thus, consistent with the teachings in the present application, Takahashi does not recognize nor attempt to attain the benefits of having increased compression stress of the surface of the glass substrate and reduced the tensile stress of the depth of the glass substrate so that the glass substrate for the magnetic disk has a high transverse strength and is prevented from damage or breakage with time.

Aratani

Aratani does disclose using a two-stage process from sodium nitrate to potassium nitrate, but the purpose is to chemically strengthen a float glass (a sheet glass having a thickness of 1.0 mm). More importantly, Aratani fails to teach, disclose or even suggest that the two-stage process can be applied to a glass substrate for a magnetic disk. Clearly, Aratani does not recognize nor attempt to attain the benefits of having increased compression stress of the surface of the glass substrate and reduced the tensile stress of the depth of the glass substrate so that the glass substrate for the magnetic disk has a high transverse strength and is prevented from damage or breakage with time.

Moreover, nothing would lead one skilled in the art to think of applying the process in Aratani to the manufacture of glass substrates, as its purpose is totally different. Specifically, in Aratani, the two-stage process from sodium nitrate to potassium nitrate is carried out in order to prevent influence due to the Sn surface generated by the manufacturing process of the float glass, i.e., to avoid the phenomenon in which degrees of the chemical strengthening process are different between two principal surfaces by formation the Sn surface. Given this goal, the first process step using sodium nitrate does not increase the strength of the float glass.

Combination of the Takahashi and Aratani;

As mentioned above, the feature of the present invention is to control the stress profile by the specific two-stage process. The combination of Takahashi and Aratani fails to teach the feature of the present invention.

By way of background, when a chemical strengthening process is carried out by a two-stage process, a second-stage process is performed under stricter condition than a first-stage process. Consequently, both compression stress and tensile stress in the second-stage process are largely different from those in the first-stage process. Specifically, if the second-stage process is simply performed so as to have higher strength than the first-stage process, the compression

stress of the surface of the glass substrate is increased and the tensile stress of the depth of the glass substrate is increased as well. In other words, both compression stress and tensile stress are inevitably increased in the second-stage process.

By contrast, according to the present invention, the second-stage process is carried out so as to increase the compression stress of the surface of the glass substrate and to reduce the tensile stress of the depth of the glass substrate in order to manufacture the substrate suitable as the glass substrate for the magnetic disk. Thus, according to the present invention, (1) only one of compression stress and tensile stress, namely compression stress, is increased in the second-stage process, (2) both are not increased, and in fact (3) tensile strength is decreased.

These are unique requirements for the substrate for a magnetic disk, with its specific use being taken into consideration.

Given this focus, the processes in Takahashi (substrate) and Aratani (float glass) would never be considered together for a product production. Further, even if considered, if Takahashi and Aratani are simply combined to perform the chemical strengthening process of the two-stage process, in the second stage-process, the compression stress of the surface of the glass substrate is increased and the tensile stress of the depth of the glass substrate is increased also. In other words, the combination of Takahashi and Aratani would completely fail to control the stress profile of the substrate, unlike the present invention, where the second-stage process is carried out so as to increase the compression stress of the surface of the glass substrate and to reduce the tensile stress of the depth of the glass substrate.

Furthermore, in Aratani, the two-stage chemical strengthening process is carried out in order to solve the problem specific to the float glass (Sn is contained on either one of the principal surfaces of the formed glass substrate because of the specific manufacturing process). Specifically, the first-stage process is performed so that quantities of alkali contained in both surfaces of the glass substrate are equalized by the use of sodium nitrate and the second-stage process is performed so that the strength of the substrate is increased by the use of potassium nitrate. This is not applicable to substrate production.

Accordingly, Applicants respectfully submit that the combination of Takahashi and Aratani fails to teach the feature of the present invention, i.e., the second-stage process is carried

out so as to increase the compression stress of the surface of the glass substrate and to reduce the tensile stress of the depth of the glass substrate.

Applicants respectfully submit that the present invention is clearly patentable over the combination of Takahashi and Aratani.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

/Alan J. Kasper/

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Alan J. Kasper
Registration No. 25,426

Date: August 2, 2007